

DELAWARE STATE MEDICAL JOURNAL

*Issued Monthly Under the Supervision of the Publication Committee
Owned and Published by the Medical Society of Delaware*

VOLUME 21
NUMBER 2

FEBRUARY, 1949

Per Copy, 50¢
Per Year, \$4.00

THE USE OF RADIOACTIVE ISOTOPES IN CLINICAL MEDICINE*

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Washington, D. C.

I have chosen to talk about two very important results of the controlled release of the energy that resides within the atom. In so doing I will describe briefly the results of a reaction which when it occurs in a very short period of time releases blast, heat and radiations which together comprise the most destructive weapon ever devised in the manufacture of armaments. Conversely, when this reaction is so controlled that it will occur over a prolonged period it will produce materials which are said to be the greatest contribution to biological and medical science since the introduction of the microscope.

The air burst of an atomic bomb has many points in common with the air burst of the more usual types of high explosive bomb. All produce at the time of explosion an intense blast effect and large amounts of heat. In addition the atomic bomb liberates from the atomic nuclei that have been split apart, radiant energy which ranges from infra red rays to gamma rays resembling x-rays to uncharged nuclear particles called neutrons. The devastation produced by the combination of these effects will be recalled in the 80,000 dead and 80,000 injured at Hiroshima and the 40,000 dead and 45,000 injured at Nagasaki. Thus the injuries produced may be mechanical, thermal or radioactive.

It is important to realize that the radioactivity liberated by an atomic bomb is not a new type of radiation. These radiations were previously familiar to physicists and radiologists, but the scale on which they are now encountered is far beyond that previously encountered.

The blast effects from the atomic bombs

were manifest primarily as secondary effects due to the collapse of buildings and the uprooting of other objects. Fractures and rupture of viscera due to individuals being thrown against buildings and other objects were encountered frequently. I am told that there were few evidences of primary blast injury; as an example of chronic otitis media is frequent among the Japanese but there were few instances of perforated ear drums.

The effects of the intense heat were extensive and interesting. Burns were noticed at distances as far as four and a half kilometers from a locus extended down from the point of the explosion. The shadowing effect in these burns was most pronounced and at the greater distances from the center there was evidence that white or light cloth gave a greater protection than did dark cloth. Due to inadequate care many of the burns were infected. As the burns healed there was hyperpigmentation in the very mild cases while the more extensive scars were devoid of pigment. In a number of cases there was extensive keloid formation which is apparently a racial characteristic and not a specific effect of the burns from an atomic explosion.

Finally, the effects of radiation were striking and of considerable interest. As you know we are acquiring increasing amounts of knowledge as to the mechanisms and variety of effects of radiation on living cells but there are many gaps in our information. Intensive study is underway on this subject in the laboratories of the Atomic Energy Commission as well as in many civilian institutions.

There are several systems in the body which show striking changes from radiation. The bone marrow is depressed as evidenced by the pronounced decrease in the formed elements of the blood. Of these various elements it appears that the lymphocytes are the most sensitive with the platelets, polys and finally the erythrocytes following in the order named. Ac-

* Read before the Medical Society of Delaware, Rehoboth, September 15, 1948.

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cordingly a rapidly progressive acute aplastic anemia was seen in the heavily exposed groups.

In addition the endothelium of the arterioles, venules and capillaries is sensitive to radiations as demonstrated by the extensive hemorrhagic phenomena. Thirdly, the gastrointestinal tract shows extensive changes in its mucosa with resultant bloody diarrhea. In the more pronounced cases the picture pathologically resembles closely that of an acute bacillary dysentery. Finally there are extensive changes in the gonads as a result of radiation. However, in the Japanese the incidence of sterility was not strikingly high for the sterilizing dose is close to the lethal dose.

Continuing studies are in progress on the survivors through the support of the Atomic Energy Commission. The possibility of genetic effects from radiation exposure must always be borne in mind but as yet we have had no evidence of such effects. The increased incidence of leukemia among physicians working with radiation emphasizes the importance of studies along this line. Bone marrow studies reveal in some cases a hyperplastic response, which may be considered as a pre-leukemia state.

Therapeutic Effects of Radioactive Isotopes

You will recall that a number of the elements occur naturally in several physical forms which are characterized by slight but separable differences in their atomic weight. However, the different forms all have the identical chemical properties of the original element. Such different forms of the same element are referred to as isotopes. The nuclei of the atoms which make up the various elements contain energy which is held within the nucleus by the normal balance of the particles which comprise this nucleus. If the nucleus is bombarded by an appropriate particle the normal balance within it is disturbed and the nucleus will emit detectable radiations as it returns to a balanced or stable state. This state is referred to as radioactive and since the atoms still retain their inherent chemical properties we refer to them as radioactive isotopes. There are presently available a number of these radioactive isotopes which are being used extensively in biological and medical research and in therapy.

In earlier studies it was learned that phos-

phorus is concentrated in high degree by rapidly growing cells and accordingly leukemic cells will concentrate considerable quantities of this element. Thus it is possible through the use of the radioactive isotope of phosphorus to deliver therapeutic amounts of radiation to the leukemic tissue in a selective manner. These studies were extended to polycythemia vera and at present radioactive phosphorus is finding wide use in the treatment of these diseases. In polycythemia radiophosphorus is the treatment of choice. In chronic myeloid leukemia and in chronic lymphoid leukemia radiophosphorus has about the same effect as x-radiation with the distinct advantage that there is no radiation sickness.

Radioactive iodine has been used in the treatment of hyperthyroidism and thyroid cancers. Here again the selective absorption of the radioactive form of the element makes possible the delivery of therapeutic doses of radiation to the gland. It would appear that in these cases of hyperthyroidism which are considered poor surgical risks radio iodine is the treatment of choice. The best results are obtained in patients with small smooth goiters and it would appear wise to reserve this therapy for patients in the older age group.

An increasing percentage of thyroid cancers will absorb sufficient amounts of radioiodine to make therapy with this material feasible. Intensive efforts are underway to increase the percentage of cases which are amenable to such treatment.

The radioactive isotope of cobalt has physical characteristics which would make it suitable for use as a replacement for radium. Study is underway to make the clinical use of this material feasible.

The potential danger to personnel handling radioactive isotopes dictates the necessity for complete familiarity with procedures and suitable facilities. An increasing number of hospitals and clinics are utilizing them in their therapeutic programs. A number of the Philadelphia hospitals have established facilities for such activities. Training in the handling of these radioactive materials may be obtained at the Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee.

The significance of radioactive isotopes in the broad cancer field is unfolding. An attrac-

tive idea is that a radioactive isotope will be found which will be concentrated in tumors in sufficient degree to make it detectable by radiation counting instruments and thus aid in the diagnosis of cancer. Many more avenues for research and clinical application have been opened by these valuable tools both in the cancer field as well as many other fields of biological and medical research.

DISCUSSION

DR. H. L. REED (Wilmington) : I certainly have enjoyed this talk by Dr. Bowers, and it has been very illuminating. I do have one or two thoughts I might give you on the use of radioactive bodies in industry.

One of the questions which I had was how frequently, or how often can you use the radioactive phosphorus in polycythemia or leukemia? I know one dose doesn't cure it. We have had a case of leukemia in which we used it, and I was wondering just how often that can be given.

In industry we are using the radioactive bodies, and it is very important for us to give adequate protection to the employees. The method of operation of the radiation upon the various tissues of the body system is not thoroughly understood and requires much additional study. In industry's use of, say, carbon 14, it is necessary to set up a programming plan so that it will protect these people. The operation has to be carried out working under a hood, with an exhaust ventilation that carries off any of the gases. They have a flue stack about ten feet high which dilutes the gas 10,000 times. Also, it is necessary to have Geiger counters in operation at the time the radioactive bodies are being used, in order that they may detect any leaks.

These products have their effect not only by contact with the skin, but by inhalation and by ingestion, and it is necessary that we have sanitary conditions as far as the employee's clothing is concerned, as far as his cleanliness is concerned after he finishes his work. A very strict personal hygiene is enforced.

I am not very well versed on this, as you can see, but I wanted to give that little point about what we are doing with it in industry. Thank you.

DR. J. W. HOWARD (Wilmington) : I want to thank Dr. Bowers on behalf of the Society and

those of us here for coming here and discussing a topic about which we all wish we knew more and one that is very timely. We have had a little experience at the Delaware Hospital with radioactive iodine. Thanks to the cooperation of the Biochemical Foundation of Newark and their physicist, we were able to get some radioactive iodine for a case which I would like to mention briefly.

As Dr. Bowers would undoubtedly tell you, teamwork in caring for these patients is very important. It isn't as casual as having a new product on the market and everybody just taking hold of it and using it. I, for one, am very respectful of the products that we have to use, and it was through the cooperation of men who are more familiar with it that our patient was treated.

Our patient, a middle-aged woman, was found to have a tumor involving the pelvis which on biopsy was confirmed by a number of pathologists as a so-called benign metastasizing thyroid adenoma. In other words, the quality of tissue was that resembling a normal thyroid, but it started to grow in another part of the body.

Regretfully, the lesion was advanced when we saw it, but, taking the literature that was then available and information from the New York-Boston group of doctors, Rawson and Marinelli, who are pooling their work in this type of tumor in thyroid carcinomas, we thought it was worth a try to see what we could do with this particular patient. It was like working in an unexplored field, and no one knew exactly the proper method or the proper dosage.

The patient was treated, and we had hopes that the basal metabolic rate would be decreased. At that time we were not aware—though we thought about it—of the advisability of removing the thyroid first before treating the patient. Dr. Bowers could probably give us a little more information on this. In the presence of an active thyroid the radioactive substance seems to concentrate in the more active organ. Initially in our case we were getting our maximum effect, as indicated by our counters, in the thyroid area, and yet we still had basal metabolic rates. So finally, after three months, as we didn't know quite where we were, we decided to take the

thyroid out and find out. We had a great deal of difficulty in finding the thyroid, which was atrophied. So actually what we were dealing with was a tumor that was still active, but so extensive that in that interim period of time the thyroid itself was affected more by the radioactive iodine than the massive tumor of the pelvis, the vertebral column, and the ribs, where we subsequently located the lesion.

We learned a lot from the case. At present she is not doing well, and is now on radiation therapy. We are hoping for some recalcification. We understand sometimes it takes a year to show the delayed results of sclerosing in these lesions. I think we started too late. If we were to do it again, I think we would probably destroy the thyroid immediately, either by radiation direct or by surgery.

Newer methods of therapy have impressed me very much. In the future, in the state of Delaware, where we have a large number of well trained industrial scientists to cooperate with us, a team that can take advantage of these newer developments, particularly in the field of isotopes, can be developed.

Again, I thank Dr. Bowers for coming. I enjoyed his talk.

DR. J. W. SPIES (Dover) : I was very pleased to hear the essayist emphasize the fact that there is nothing new in the radiation by the atomic bomb or from the uranium pile, except as to quantity.

I think those of us who have worked in this field a good many years have sensed the fact that a great many people, especially the laity and oftentimes the physician, thought there was something mystical about it. So I was glad to have him emphasize that point. I, too, want to thank him on the very lucid and practical presentation.

I have two questions. One is in relation to these cases in the Japanese. As I understand it, the pigmentation of the skin occurred around the edges of the burns when they were very large, and in other burns not so large.

From experience in treating radiation burns, if you want to call it that, or other types of burns, it seems to me that this might be explained by the fact that the skin was partially damaged in both instances around the large burn and inside the small burn. I would like to hear what conclusion he has on that.

The other is the menstrual irregularities of the Japanese women, which he said were probably due to the fact of psychological and nutritional disturbances. I wonder if those have largely corrected themselves since the war has stopped and we have occupied the country.

Again, I would like to thank him for the points he has made. They were clear and very practical.

DR. J. W. HOOKER (Wilmington) : I should like to ask Dr. Bowers when the Atomic Energy Commission anticipates that substances like radioactive phosphorus will be made available to hospitals outside of the medical centers.

I realize that their recent communiques have stated that a physicist must be in attendance when these particular preparations are used, but I know that some institutions have given radioactive phosphorus when a physicist was not in attendance. I would like an answer to that question.

DR. BOWERS : Thank you very much for the kind remarks about what I had to say.

With regard to the schedule of therapy that is used in the treatment of leukemia and polycythemia, in the beginning Dr. Lawrence and Dr. Stone of California, and a number of others attempted to standardize dosages of radioactive phosphorus and radioactive iodine.

Subsequent experience has taught us that it is much better to treat the patient as an individual case than to attempt to standardize the use of the therapy.

For instance, in treating a patient with polycythemia vera, the practice is to give a dose of about 5 millieuries of radioactive phosphorus, depending upon the level of the blood count, to repeat in two weeks and then to wait until there is a sign of a recurrence of the disease.

In myeloid leukemia, most clinics now do not attempt to bring the blood count to normal, but attempt to induce clinical improvement with reduction in size of the spleen and improvement in the blood count. But many are more interested in symptomatic improvement rather than in bringing the blood count to normal. We know that that is a wise procedure, because frequently if you attempt to bring the blood count to normal, it continues on down into the aleukemic levels.

I was very much interested in what Dr.

Spies said about pigmentation. There are two reasons why I did not mention radiation. The first is that we found these peculiarly pigmented scars in patients who, we felt, were too far away to have received radiation. It is apparent that the heat extends for a farther distance than does the radiation.

I have been told by friends of mine who attended the experiments in New Mexico that they felt a good, solid wave of heat against their faces, and they did not receive any effects of radiation.

As far as the menstrual abnormalities are concerned, the Japanese women are menstruating freely and normally.

The Atomic Energy Commission, you may be interested to know, Dr. Spies, is supporting a continuing study group which is run by the National Research Council. We have laboratories being established in both Hiroshima and Nagasaki, as well as in Kure, serving as a control city. They are carrying out continuing hemolytic studies, genetic studies, and we have a wonderful catalog of the approximal single dose of radiation that each survivor received.

So I think that from the studies of this Commission we will gain a great deal of material about the effects of a single dose of radiation on the human body.

The only deleterious effect which has been noted is that in the bone marrow of some patients there is evidence of hyperplasia. Some hematologists think that is a preleukemia lesion, so we are following those patients with very keen interest.

With regard to Dr. Hooker's question regarding radioactive phosphorus, the number of physicists that is required depends largely upon the radioactive isotope that you are using.

Radioactive phosphorus emits large numbers of particles which are not fully penetrating, so that the dangers in handling it are nowhere nearly as great as are the dangers in handling radioactive iodine which emits highly penetrating particles.

The Atomic Energy Commission is now sponsoring courses at Oak Ridge, to which physicians or bachelors of science may go for a period of one month to receive what we feel

is all the training that you need to have to use radioactive isotopes in clinical medicine. So I think that that should be of considerable value. Thank you very much.

CURRENT POLIOMYELITIS RESEARCH*

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Poliomyelitis is not a disease of high mortality. It is feared mainly because so many of those who survive are left in a permanently disabled state. It usually strikes in childhood, and interferes with growth of the affected parts. Deformity is thereby added to the original crippling. The total effect on the life of the patient is proportional not only to the degree of disability but also to the number of years it must be endured.

The principal danger to life is from complications occurring in the acute disease. These are usually respiratory difficulties. We have learned much about dealing with them, and the mortality has been reduced by such measures. We can help the patient to make effective use of nerves and muscles that are left intact. In some degree we can forestall or correct deformities. In these limited fields our techniques have been greatly improved. We have provided equipment, trained personnel, and an organization for mobilizing these resources to best advantage.

We cannot, however, repair the damage done by the virus in the central nervous system. There is no convincing evidence that any therapy now available will check or prevent it. I must point out here the unfortunate confusion that has repeatedly arisen, and continues to arise, from reports on the use of a given method of therapy in a small series of cases. If these are accepted as evidence, one would infer that there are already available a number of drugs that will cure poliomyelitis. Besides the reports published in journals or in the daily press, the National Foundation receives letters from various physicians, each recommending some therapy and offering in support case records of patients who have recovered under it. I am not saying that all these therapies are totally ineffective. I am

* Read before the Medical Society of Delaware, Rehoboth, September 14, 1948.

** Medical Director, National Foundation for Infantile Paralysis.

merely saying that the evidence submitted is not sufficient to justify a conclusion in either direction.

In a disease as variable in its clinical course as poliomyelitis is, the evaluation of any therapy is a difficult task. To be of any statistical value, the series of cases treated must be large. But this is not the only requirement. The test must be made under conditions that will allow a valid comparison between two groups, treated and untreated, but otherwise similar. In attempting such a comparison we must remember that the disease varies in severity not only from case to case but from one outbreak to another. We probably cannot, in dealing with human patients, set up such rigid controls as any biologist would consider necessary in a similar experiment on animals, but we should conform to that ideal as nearly as possible, and in proportion as we fall short of it we should be cautious in drawing conclusions.

It should be obvious that controlled therapeutic tests on human patients cannot be lightly undertaken. On the other hand uncontrolled tests, which we have in abundance, merely confuse the picture. The best approach, in seeking effective chemotherapy, is to carry out preliminary tests on animals. Unfortunately, monkeys and apes are the only animals known to be susceptible to all strains of poliomyelitis virus. They are too scarce and expensive to be used for testing on a large scale. The procedure now being followed, in projects supported by the National Foundation, consists of preliminary screening of drugs by tests on mice. These are infected either with the Lansing strain of poliomyelitis virus, or with one of the other neurotropic viruses. Several hundred synthetic compounds and antibiotics have been thus screened. Most of them have been quite ineffective, but a few have shown some promise. The most active will be tested on monkeys and later, if the results warrant it, in human cases.

We must note that virus diseases as a group have not been found amenable to chemotherapy. There have recently been some encouraging reports on rickettsial infections. The field should be explored as thoroughly and systematically as possible. That is what we are attempting to do, with respect to poliomyelitis.

Other groups are working on chemotherapy in other virus diseases, and as any agent is found effective against one virus it will be tried against others.

Research is being directed toward finding methods of prevention as well as treatment. One approach is to trace the life history, distribution and means of spread of the virus, in the hope that sources of infection can be eliminated. We know the virus multiplies in the human body, but have found no evidence that it does so anywhere else under natural conditions. Virus is given off from the infected human body mainly by way of the bowel. While it may be present in nasopharyngeal secretions, there is little direct evidence that significant amounts of it escape by way of the mouth or nose. It can survive outside the body for long periods of time, but we do not know how it is transmitted from person to person. There is frequently a history of contact with some recognized case. But even if infection does result from contact, we still do not know the precise mode of transfer of the virus. The word "contact" covers a variety of situations, with an equal variety of possible agencies of transfer. Flies are known to be occasional carriers of virus, but we do not know how many human infections, if any, can be attributed to them.

It is now clear that the majority of us become infected, at some time during life, with the virus of poliomyelitis. The clinical disease and the infection are not the same thing. The disease is rather an exceptional result of the infection. The evidence of this comes first, from the immunologic studies, which show that the majority of adults have serum antibodies that apparently result from an earlier infection; and that the proportion of such positive reactions increases with age, roughly from two years on. Another line of evidence comes from virus studies which have shown that in epidemic areas the number of apparently healthy carriers greatly exceeds the number of clinically diagnosed cases. Thus far both the immunologic studies and the search for carriers have been on a small scale. The laboratory procedures are so time-consuming and expensive that extensive surveys are prohibited. But it seems clear that to find and shut off the sources of infection is a much

larger task than one would have suspected from statistics on the reported disease alone. However, the virus is spread, it is spread widely. One hundred per cent elimination of the virus would no doubt eliminate the disease. But half-way measures might merely postpone the average age at which infection occurs, without reducing total incidence of the disease. In fact, epidemiologic data strongly suggest that this very change has taken place within the past half century. It is only within this period that poliomyelitis has become epidemic. It has become epidemic in those countries where sanitation has become most advanced. And in those same countries the incidence of the disease has been steadily shifting toward the older age groups. There are, moreover, some statistics indicating that the disease is, on the average, more severe in the older groups.

We are continuing to study the means by which virus is disseminated and the media from which infection occurs. That is necessary for a complete understanding of the disease. I am merely pointing out that the degree to which an area is saturated with virus is probably not the only factor determining the incidence of poliomyelitis; and that we should not expect too much from a local and temporary control of the virus, even if we knew how to achieve it.

The second possible method of prevention is to increase individual resistance to infection, either by vaccination or by some other form of prophylaxis. I have mentioned already the fact that infection with the virus of poliomyelitis is in most instances harmless. We do not know what factors determine whether a given infection is to be mild or serious. Conceivably the mild and severe infections might be due to different strains of virus, some highly pathogenic, others less so. But the healthy carriers found by virus tests are often found to belong to a family group, in which one or more members were severely paralyzed and in which all had apparently become infected about the same time. One would naturally suppose, under such conditions, that they were infected from a common source and by the same virus. Moreover, in order for us to identify a poliomyelitis virus at all, it must produce the typical disease in an inoculated monkey. The strains re-

covered from healthy human carriers have all, therefore, been pathogenic to monkeys, although they do vary somewhat in the severity of their efforts.

It is possible, again, that the course of an infection, whether mild or severe, may be determined by the route over which the virus enters, or the amount taken in. In animal experiments, however, little relation can be found between the dose of virus and the severity of the disease, provided the dose is sufficient to infect at all. We do not know the precise pathways over which virus can gain access to the human body, so the influence of this factor remains unknown.

It seems quite probable that some variable physiologic factor operates, in the individual host, rendering the central nervous system either vulnerable or resistant to invasion and damage by the virus. Much study has been given to this possibility. Dietary factors, endocrine status, and other variables have been and are being investigated. While minor variations of susceptibility have been found, no factor yet studied seems sufficient to account for the variations in severity of human infections. In this connection we may recall the frequent reports of abrupt onset of clinical poliomyelitis in man following over-exertion or chill.

What has already been said refers to the varying severity of a first infection with poliomyelitis virus. In addition there is an immunity acquired as a result of infection, and which suggests the possibility of conferring a similar immunity by vaccination.

From studies directly on man, we know relatively little about acquired immunity to poliomyelitis. The age distribution of the disease, it is true, is strongly the reverse of the age distribution of antibodies in human sera. While there is a general impression that one attack of poliomyelitis brings immunity, there have been apparently authentic reports of second attacks. Finally, we would like to know whether or not a sub-clinical infection in the human brings immunity. Our virus studies on humans have shown that an infected person will excrete virus in the stool for a few weeks, after which it disappears; but as far as our direct evidence goes the same person might later become infected again by the same virus,

becoming a carrier again or possibly even becoming paralyzed.

Animal experiments give more information on these questions. The chimpanzee can be infected by feeding the virus of poliomyelitis. The result most frequently is a mild or inapparent type of infection, manifest by a temporary carrier state in which the virus appears for some weeks in the stools. If later the same virus is again fed to the animal, he does not again become a carrier nor develop any other signs of infection. If other strains of virus are used in the attempt to reinfect, the chimpanzee is found to be still susceptible to some, but immune to others. Evidently there are families or groups of viruses, each consisting of several immunologically related strains.

The rhesus monkey usually cannot be infected by feeding virus. He can be infected by inoculation, and the infection is nearly always of a severe type. But if the monkey recovers from one attack he is thereafter immune to later inoculations with the same virus. In rare instances and with huge doses, a second infection can be produced with the same virus, but for any practical purpose the immunity is complete. Such an animal will still be susceptible, however, to some other strains of virus.

Obviously the existence of different immunologic strains may easily account for the reported second attacks in human beings. Obviously also we must know how the different strains of poliomyelitis virus are related to each other before we can work intelligently toward artificial immunization of humans. Since there are some hundreds of separate strains that have been isolated from different human patients, the working out of their relationships is a huge task. Only a few have been studied thus far. With one or two borderline cases, these seem to fall into two distinct families. Later work may show that there are more.

Monkeys can be successfully vaccinated against any group of viruses, and probably against a combination of groups. The most effective vaccines, however, contain live virus, and in any large group of animals vaccinated a small number will be infected by the vaccine itself. Obviously such a vaccine cannot be used on human beings. It is possible to inactivate the virus and still leave it effective as a vaccine, but this procedure is at present highly

uncertain. It has not been standardized. To prepare and standardize inactivated vaccines in useful amounts entails technical difficulties that have not yet been solved.

The virus of poliomyelitis is one of the most difficult of all pathogenic agents to handle in the laboratory. That is because of its peculiar choice of host animals, which we cannot change. We are constantly seeking simpler techniques, and we have learned a great deal even with the cumbersome methods available to us. It is difficult to fit all our present facts into a logical pattern, but that situation has recurred repeatedly, and been resolved, in the history of other diseases. From our experience with them we may confidently predict that poliomyelitis eventually will be conquered.

120 Broadway.

DISCUSSION

DR. ALFRED R. SHANDS (Wilmington) : Mr. President, Members and Guests: Dr. Van Riper has given us a great deal to think about. I don't know that I can add to what he has said, other than to comment on a few of the points which I jotted down as he talked.

It is very significant when he makes the statement that at the present time there is no therapy which will check the spread of the virus. We read in the newspapers about the various cures and various things that have come up, which lend hope to patients. I think one of our duties as physicians is certainly to interpret correctly to our patients and parents of patients what is what, especially with all that it means to the mother, who has the stricken child. In an epidemic in her nervous, excited state, it is one of the things we certainly should do; we should try to give the mother who has healthy children comfort in telling her at the present time there is nothing which can be done to keep from spreading this infection once it comes.

Another significant statement, namely, that there is at the present time no chemotherapeutic agent which will affect the virus. As some of us know, there is a new preparation, darvusil, which is being used. It is still in the experimental stage and it may have some permanent value. We cannot with any degree of confidence use or recommend it to be used at this time.

There is no doubt that the experimental work which has been financed by the National Foundation over these last ten years has explored the virus field thoroughly. I don't know—perhaps Dr. Van Riper can tell us—the per cent of the funds which have gone into research on polio, and that which has gone into research on the virus proper. I would say that certainly the largest percentage has gone into that form of investigation. The field is being thoroughly investigated and I feel certain that in the course of time we will know perhaps what the answer is, how to check and prevent the spread of the disease.

It is rather interesting to hear Dr. Van Riper's remarks on flies, about the epidemics being in those communities and countries where the sanitation is best; and that where sanitation is poor there is less incidence of polio.

During the past summer I had the pleasure of attending a medical meeting in Mexico City and hearing a talk by the professor of contagious diseases at the University of Mexico Medical School. I was amazed to learn that in Mexico, which is a country of extreme poverty, with lack of general sanitation certainly among more than two-thirds of the people, up to 1945 there had not been over 50 cases reported in the whole of Mexico, which has a population, I believe, of about 45 million people. In 1946 there were 210; in 1947, 240, and this year there had been a real epidemic in and around Mexico City, and up until the first of July they had had over 275 patients.

There is no doubt that there is an increased resistance on the part of the patient as the patient grows older, as is borne out by the study of the age groups in these epidemics.

I did not know that you had to inoculate a rhesus monkey to infect it. Perhaps that has some significance for the etiology in the human. Perhaps it isn't an infection carried into the body by the nose and throat or the intestinal tract; perhaps it is another method of infection.

I have enjoyed Dr. Van Riper's paper very much. We are very fortunate to have him here, because he certainly represents the best thought in poliomyelitis today.

DR. G. J. BOINES (Wilmington) : Mr. Chairman, Members of the Medical Society of Delaware and Friends: I enjoyed Dr. Van Riper's paper very much. I feel certain that Dr. Van Riper and the National Foundation for Infantile Paralysis are very proud of the splendid First International Conference for Infantile Paralysis which they held last July at the Waldorf Astoria, in New York City. In my opinion that was one of the most elaborate and most thorough studies that has ever been given to any disease in the history of medicine.

Delaware has had three poliomyelitis epidemics thus far, in 1944, 1947, and the present year 1948, and it might be of some interest if I give you some figures and facts on the patients admitted to the Doris Memorial Hospital thus far this year. A large number of physicians have referred the patients from all parts of our state. Of the 115 patients reported up to yesterday, 95 have been under our care at the Kenny Clinic, referred to us by 32 Wilmington physicians and 28 physicians from the rest of the state. In other words, 60 different physicians have referred our 95 patients, and 12 others have reported 20 patients under the care of other physicians.

I would like to confirm with our figures what Dr. Van Riper said about the age incidence of poliomyelitis cases: that is, 75 per cent of all our cases have also been under the age of 15 years. The youngest was 8 months, with a severe paralysis, and the oldest were 47 and 58-year-old males with confirmed symptoms and spinal fluid findings.

The types, according to involvement, were: non-paralytic, 47; paralytic, 43; and bulbar paralytic, 25. There were four deaths thus far this year, two deaths in our group of 95 patients and two deaths in the group of 20 patients treated by other physicians.

The cases are distributed throughout the state about the same this year as they were in '44 and '47; that is, 52 from Wilmington; 40 from New Castle County; 8 from Kent County; and 15 from Sussex County. Due to my lack of knowledge of the exact division of Kent and Sussex, it may be that there is a little irregularity in the figures. However, most of the cases came from Sussex, four being from Lewes and eight from Rehoboth.

Now as to the month in which the epidemic started this year. The first patient came from Ellendale, Del., in February, 1948. A virulent human strain of poliomyelitis virus was isolated from this case through monkey inoculations by Dr. Joseph L. Melnick, of the Yale Laboratories. Five cases were reported in June; 53 in July; 43 in August; and 13 thus far in September.

In 1947 we had the mildest epidemic; there were 39 paralytics and 7 bulbar out of the total of 122 cases reported. There were two deaths. There were two severely paralyzed children, each one having both lower extremities severely involved. In 1944 there were 39 paralytics and 16 bulbar cases out of a group of 88; 45 of this group were severely paralyzed. In 1948 the number of paralytics is 43 and bulbars 25, and most of these are severely affected, thus far there are 13 upper and 20 lower extremities severely paralyzed.

Before I finish my comments, I would like to recommend strongly that the Medical Society of Delaware make some plans to appoint a permanent year-round committee to study methods of control, methods of disseminating knowledge, and suggest methods of diagnosing and treating poliomyelitis in the state of Delaware. This, in my opinion, is very important due to the fact that polio has created a panic in the past three years not only in the public of Delaware but also among many of the physicians. I feel certain that there are many improvements which can be made in the environmental sanitation in our state, including Wilmington, and as a result the public will benefit by it.

I agree with Dr. Van Riper and Dr. Shands that the polio virus cannot be stopped from progressing once it has entered the nervous system. However, it should be stressed that methods in the treatment of polio developed in the past few years have increased the speed by which polio patients can be rehabilitated, and have diminished deformities and crippling effects in a large number of cases. Some of these new methods are the Kenny method of diagnosis and treatment; the use of oxygen which we now use very liberally on all seriously involved patients coming into the hospital, the use of curare with intensive physiotherapy, the use of prostigmine, blood, intravenous

fluids, etc. We have been using darvisul* in the past four or five weeks in a number of severe cases who were admitted early in the onset of the disease. We are not convinced as yet, that this sulfa derivative is useless. We have had many patients who, from our past experience, would have succumbed because of the very rapid and extensive paralysis which they developed, but these patients recovered and are living today even though they have extensive paralysis of the body and extremities.

However, as it was stated before, it is very difficult to evaluate what results one gets in the polio patient as far as the paralysis is concerned, because of the fact that in some patients the paralysis stops short of death although completely paralyzing the victim, and other patients go to complete paralysis and death in spite of all the treatment.

One point, in my opinion, is very important to emphasize and that is that early diagnosis and early hospitalization will do a great deal in preventing deaths and in diminishing some of the paralytic effects.

As far as Mexico is concerned, I would presume that the reason many cases were found there before the war would be that they were not reporting the cases, and again the transportation and intercommunication between Mexico and this country was not as extensive as it has been since the war. The increase in polio in that country since the war can be attributed to better methods in diagnosis and reporting, and the large numbers of Americans visiting there and carrying with them the polio virus of which this country has so much.

I would like to ask Dr. Van Riper a question before I close my remarks. I have noticed that about 65 per cent or more of our patients are light-haired or blondes. I was wondering whether this is a coincidence or whether the polio virus prefers blondes to brunettes.

DR. E. R. MAYERBERG (Wilmington) : I saw in one of the daily papers a few nights ago where a noted pediatrician in the Midwest was advancing some new theories as to the cause of polio, or he gave some reasons why certain districts were not affected by polio. He said polio usually followed the course of a river, that people who lived on hilltops were

* Supplied by the Lederle Laboratories.

never infected with polio, and that it was transmitted, he believed, more from mosquito bites than from flies or anything else.

Mr. President, in my opinion, all of this shows that we know nothing about polio, and we might as well be honest about it. And that brings me to some of the things that have been happening in this state over a period of years.

We closed our swimming pools during the most important time of the year when people can be out and swimming. Why did we close our swimming pools? Have we proved that infection is carried through water containing nasal secretions?

The doctor just said that we have not proven an infection, coming from swimming pools. We don't know whether it is through the nose or throat or through the intestines or through the skin. In other words, we just plain don't know.

Three or four years ago the National Foundation came out and state organizations followed suit, advising no operations on the nose and throat during the polio season. They publicized extensively that it caused the bulbar type of polio. We all stopped, I stopped, and this year I stopped towards the end of July. One case that had been operated on two weeks before he was taken with polio died of the bulbar type. The papers were full of the fact that this one child had been operated on two weeks before and had died of polio.

It caused a woman, who seemed quite intelligent, to write a letter to the newspaper, and she roasted everybody who had anything to do with that case. In fact she censored the entire medical profession. It was not my case. She lambasted the surgeon who would dare to operate on any nose and throat case during the polio season. She wrote the newspaper letter because the National Foundation had advised against operation, and she felt, from the tone of their advice, that they were positive that was the cause of the bulbar type of polio. I don't believe they know, and certainly I don't know. Investigations by several national organizations have disproved that theory.

I have gone back to operative work now, because I don't think it has any direct bearing. It may have a bearing in this way: It lowers resistance, but if a patient who is convalescent

is kept at rest for a week or ten days, he probably isn't as susceptible to infection as a child who is running around the street and becoming exhausted from overexercise.

I personally feel that I am not endangering my patient, and I am going to keep right on, until the National Foundation or someone eventually finds out something about polio and proves to me beyond a doubt that I am doing wrong, I am going to keep on operating in and out of season.

DR. VAN RIVER: Dr. Riggan, I wish to thank everyone for their discussion. I will briefly try to cover the points raised. First of all, in round numbers, approximately \$18,000,000 has been spent on virus research and treatment and after-effects and epidemiology, in the ten years of the National Foundation's existence.

You must remember with regard to the annual March of Dimes, that only 50 per cent comes to national headquarters, and this \$18,000,000 is, I should say, approximately 40 per cent of the total received by the national headquarters, which has been spent on direct research on virus epidemiology and treatment and after-effects.

Dr. Shands raised the question of non-infection of the rhesus monkey. Just prior to the last war, purely by accident, an importing company in New York had gotten some cynomolgus monkeys from the Philippines. It was found that on feeding that particular species of monkey, it was possible to infect them, by way of the gastro-intestinal tract. Naturally, this is a much more normal means of infection, and the resulting disease, if the monkey does become infected, more nearly approaches the clinical disease seen in man.

Then along came the war and we couldn't get cynomolgus monkeys, and for all the years during the war we had to use the rhesus monkey from India, and it is true that the only way you can infect that animal is by direct introduction of the virus into the central nervous system.

We will all agree with Dr. Boines, I am sure, that early hospitalization and the present treatment that is being used everywhere, that is, hot packs, early and active physical therapy, certainly is reducing the number of persons with severe handicaps, and, in any event, those patients, coming to surgery, are much better

risks and the surgeon has much better material to work with.

The thing that I want to point out is that today we have no way of controlling an epidemic, no way of arresting the progress of the virus once it is in the human body, and we cannot prevent its destruction of central nervous tissue and subsequent paralysis of the muscles that are enervated by those nerves that are destroyed. Neither can we do anything to repair damaged or destroyed nervous tissue.

The new sulfanilamide has received very wide publicity. Science News Service came out with the statement that 50 children were walking because they had received darvisul. Gentlemen, we have all seen enough polio to know that we do not know why one patient dies and one recovers. It isn't anything that any of us have done. We might as well give the good Lord credit for that.

In spite of the claim that darvisul does not have any toxic effect, I know where it was used in one hospital where I believe investigators were competent to judge, where they had one patient—only one—that developed an anemia, a hemolytic anemia. We all know that all of our sulfanamides, in spite of what the manufacturers may say, may have toxic effects, and until such time as somebody can establish the optimum dose of the darvisul, devise some means of determining the blood level—which they haven't done yet, I think we had better be pretty cautious about using it.

As far as blondes vs. brunettes are concerned, I sometimes think that is sort of a clinical impression that we get. We used to say that poliomyelitis was almost unheard of in the Negro. In Detroit, where we had a very severe epidemic in '46, it went right down through the center of the Negro section of that city. On a trip to North Carolina last week, I found there were a number of Negroes with polio.

Perhaps one reason we rather look for this thing is that the early poliomyelitis epidemics were certainly reported in the Scandinavian countries, and they run a little bit more to blondes.

As far as insects are concerned, I think every type of insect known to man has been investigated as a carrier, or as a vector of this disease. The common house fly, in spite of the

Phillip Morris program, is not a carrier of the virus. It is the so-called filth fly, the green-bottle fly. They not only carry the virus on their bodies, but they may ingest material contaminated with the virus, carry the virus in their own digestive tract for some time and then excrete it. As far as we know, the virus does not multiply within the fly.

Closing swimming pools: We have always badgered that, and we have never taken a firm stand, because no one has ever been able to recover virus from any swimming pool that I know of, and I think every swimming pool in existence has had samples taken from it.

The only reason for closing the swimming pool that I can see is that it is a place of congregation of people from many areas in a community, and that it is the personal contact between persons that spreads the disease and not the water.

We have never advocated the closing of swimming pools. In fact, we are assisting one health officer in one southern state who is being sued by a swimming pool operator because he closed the pool.

As further evidence, in Asheville this last year, that was really a dead city. They closed everything and prohibited any child under 16 years of age to be out of his own yard, and their epidemic went right along as it did in all the rest of North Carolina. It didn't stop it one single bit. They closed churches, movies, swimming pools, every place of congregation, and it had no effect upon the incidence of the disease in that community.

And as someone said before this meeting started, when you close swimming pools, then you just drive the children to the old swimming hole or to the movies or somewhere else.

As far as closing the movies, I was on a panel in Denver a year and a half ago, with Dr. Carl Meyer of California, who is very outspoken. The question was asked, should they close the movies? He said, "As far as control of polio, I don't think it is necessary to close the movies, but I think it would be a good idea just to close them for moral reasons."

As far as tonsillectomies, again the National Foundation I think did go well out on the limb on the question of T & As. Do we have supporting evidence? There are reports in scientific literature showing that injury to the

mucous membrane or exposure of dental pulp does seem to increase the likelihood of infection of the virus, if the virus is present, and that when children have had recent operations of the oral pharynx, and they do develop polio, there is a little greater chance of them developing a bulbar type.

The theory behind that—and the work reported by Schmidt of the MIT just within the last week—is that it gives another link that probably the virus travels along the nerve fibrils. It is not a lymph or blood infection. It passes directly along the nerve trunks direct to the nervous system, so that the exposure of nerve trunks by surgery or injury does certainly give a better access or avenue of entrance to the virus.

This last year we have only said that parents should consult their family physician and discuss with him the need for surgery if epidemics were prevalent. In that way we felt we protected everyone concerned. It isn't an established fact. In fact, in cooperation with one of the schools of public health, we hope, within the next year, to try to do a very careful survey of reported cases of polio to determine whether those children had had any surgery prior, that is, immediately prior to developing signs and symptoms of polio.

I agree with the doctor; it is a very moot question, and you can argue both sides of it, and I don't think we have time to do it here. Thank you.

THE DELAWARE HEART ASSOCIATION

EDGAR R. MILLER, M. D.,
Wilmington, Del.

The Delaware chapter of the American Heart Association was organized on February 1, 1949, at the Delaware Academy of Medicine, Wilmington. The American Heart Association has been a national organization of cardiologists for the past twenty years or more. In 1946 by-laws were passed to broaden the scope of its membership so as to include not only cardiologists but also other physicians, public spirited laymen, social workers, and public health servants who were interested in cardiovascular diseases. The purpose of this action was to fulfill not only the scientific aspect of heart disease but also the relation of these diseases from the point of view of statistical knowledge, public health and economic aspects. This at first would give the impression of diluting the scientific aspect of heart disease, but in order to compensate for this, the Medical Council of the American Heart Association was formed which consists only of physicians specializing in cardiovascular diseases.

This year, on February 14, the national organi-

zation will launch a campaign for \$5,000,000. Mr. Harold E. Stassen, general chairman of this campaign, has enlisted many outstanding citizens not only of the scientific world but also of the business and entertainment world. This campaign will be publicized extensively via television, radio, and newspapers. The Delaware Heart Association will cooperate with the national organization in this campaign. Delaware's quota will be \$25,000. Thirty per cent of this will be forwarded to national headquarters, while seventy per cent will remain in Delaware for the purpose of carrying out a program which has been proposed by the Program and Budget Committee of the Delaware Heart Association. The principal features of this program are as follows:

- I. EDUCATION:
 - A. Secure speakers on heart disease.
 - B. Modern concepts to all interested physicians of cardiovascular.
 - C. Disseminate information to lay groups.
 - D. Instruction for nurses.
- II. COORDINATION:
 - A. With Beach House.
 - B. Governor Bacon Health Center.
 - C. With Tuberculosis Association, X-rays.
 - D. With Vocational Rehabilitation Program.
 - E. Curative Workshop.
- III. CASE FINDING:
 - A. Urge routine reporting of acute rheumatic fever.
 - B. Find needy cases of:
 - 1. Subacute Bacterial Endocarditis.
 - 2. Congenital Heart Disease.
 - C. Encourage the gathering of information pertaining to heart and vascular diseases.
- IV. CONVALESCENT CARE:
 - A. Cooperate with Beach House.
 - B. Cooperate with Governor Bacon Health Center.
- V. CHRONIC CARE:
 - A. Cooperate with Governor Bacon Health Center.
 - B. Study needs and make recommendations for education of patients of heart disease.
- VI. COOPERATE WITH EXISTING HEART CLINICS:
 - A. Memorial Hospital.
 - B. Delaware Hospital.
 - C. St. Francis Hospital.
- VIIA. FINANCIAL ASSISTANCE TO NEEDY PATIENTS HAVING:
 - 1. Congenital Heart Disease.
 - 2. Acute rheumatic fever.
 - 3. Subacute bacterial endocarditis.
 - 4. Such other cases as may be recommended by the Medical Committee of Delaware Heart Association.
 - B. All patients needing financial assistance must be passed upon by the medical advisory committee, after recommendation by a recognized social agency.

When we consider that rheumatic, hypertensive, congenital and coronary heart disease plays such an important role in the morbidity of our citizens it is earnestly hoped that the physicians of the state of Delaware will lend their full cooperation in this new and worthy effort. Any suggestions or contributions that you can make will be appreciated.

11 North Maryland Avenue.

Substandard Medicine

A distinguished American physician recently observed, at first hand, what is happening to medical practice in England under the Labor Government's act giving everyone "free" service.

The act, he points out, did not create a single extra doctor, nurse, hospital bed or any other facility. But the demand for the allegedly "free" service has been enormous. Doctors must see an average of 100 patients a day. As a consequence, he says, "This overloading has made it necessary for the physician to shy away from the chronically ill, the aged, the children, the pra-tubercular, and the borderline mental case in filling his panel. The vast amount of unnecessary medical care is crowding the very group that the plan was touted as serving."

Finally, he found that the quality of practice is declining as well. Services which the American people regard as routine—such as obstetrical and dental anesthesia—are not considered necessary and are not covered by the act.

What makes these expert observations particularly important is that plans now being urged for compulsory government health insurance in this country have a great deal in common with England's experiment. And, should they pass, there is no reason on earth to believe that the result would be different here. Government-controlled medicine is substandard medicine, no matter where it is tried.—Editorial, *Foxboro Reporter* (Mass), December 18, 1948.

[Ed. Note—The Editor is Clark Samuel, son of Dr. M. I. Samuel, of Wilmington.]

Cuts From Broken Fluorescent Lamp Tubes

Fluorescent lamp tubes are now extensively used in offices and homes. These lamps contain beryllium compounds and such com-

pounds when introduced into wounds, greatly delay healing. Care should therefore be exercised when handling burned out or broken tubes to avoid cuts and lacerations. Should such accidentally occur, consult a physician and have the wound thoroughly cleaned. Otherwise, a painful, persistent, open wound may result. Avoid breathing the dust from broken lamp tubes as it is harmful.

Care should be taken in disposing of discarded tubes so that there will be no possibility of children picking them up and using them as playthings.—E. I. duPont de Nemours Company, Medical Division, G. H. Gehrmann, M. D., Medical Director.

C. H. I. Debate

The topic for "America's Town Meeting," 8:30 to 9:30 p. m., EST, over ABC network's 252 stations, for Tuesday, February 22, will be "Should We Adopt A Compulsory Health Insurance Program?" with a panel of four nationally known speakers. Clifton Fadiman, radio personality and literary critic, will substitute for George V. Denny, Jr., regular moderator of the Town Meeting broadcast-telecast.

The speakers will be Dr. Morris Fishbein, editor of the *Journal of the American Medical Association* who has recently been appointed adviser to the Atomic Energy Commission and is Chairman of the Committee on Information, Division of Medical Sciences, National Research Council, and member of the American Public Health Association, Senator H. Alexander Smith (R. New Jersey), member of the Senate Labor and Public Welfare Committee, and former Chairman of the Senate Sub-Committee on Health; Oscar Ewing, lawyer, Federal Security Administrator and former Special Assistant to the United States Attorney General, and Walter Reuther, president of the United Automobile Workers, C. I. O.

+ Editorial +

DELAWARE STATE MEDICAL JOURNAL

Owned and published by the Medical Society of Delaware, a scientific society non-profit corporation. Issued about the twentieth of each month under the supervision of the Committee on Publication.

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Articles are accepted for publication on condition that they are contributed solely to this JOURNAL. Manuscripts must be typewritten, double spaced, with wide margins, and the original copy submitted. Photographs and drawing for illustrations must be carefully marked and show clearly what is intended.

Footnotes and bibliographies should conform to the style of the Quarterly Cumulative Index Medicus, published by the American Medical Association, Chicago.

Changes in manuscript after an article has been set in type will be charged to the author. THE JOURNAL pays only part of the cost of tables and illustrations. Unused manuscripts will not be returned unless return postage is forwarded. Reprints may be obtained at cost, provided request is made of the printers before publication.

Subscription price: \$4.00 per annum, in advance. Single copies, 50 cents. Foreign countries: \$5.00 per annum.

VOL. 21 FEBRUARY, 1949 No. 2

WHAT WILL THE ULTIMATE SCORE BE?

Apparently the American public is beginning to think about the problems involved in the proposed compulsory health insurance scheme. Mr. Oscar Ewing and a host of other government functionaries have spent untold millions of the taxpayers' money to tell the people why compulsory insurance is the only thing. The AMA's assessment of \$25.00 per member can raise at the most only three or three and one-half million dollars to educate the public concerning the other side of the picture. This as it should be, though it comes a bit late. The people should decide every fundamental issue on the basis of (1) facts that can be given, (2) careful consideration of these facts, and (3) good old-fashioned American horse sense. The discussion of this matter on both sides has been at times the kind that sheds heat, but not much light. The time has come to turn on the light.

We have not seen many polls in the public press on this question, possibly because even the press is just now awakening to the serious implications of any compulsory health insurance proposition, not only because of the costs which will mount and mount as the years go by, but the appalling thought that once started there can never be any turning back or abandonment of the proposition. The

Philadelphia Sunday Bulletin for January 30, 1949, gives the result of a ballot on this question, and the opponents won by a score of 51-49. Their story follows:

FORUM READERS LUKEWARM ON NATIONAL HEALTH INSURANCE OPPONENTS OF PROPOSAL WIN BY SLIM MARGIN

Philadelphians are not ready for a compulsory national health insurance law operating like social security, judging from the views of readers participating in today's Forum.

Voting on ballots published January 15 and 16, readers rejected the proposed new law by a narrow majority.

The questions on the ballot and the answers:

Are you connected with the medical profession?
About one-eighth of those voting said they are.

Are you connected with the dental profession?
About one out of 50 said they are.

Would you be willing or unwilling to pay 1% or 1½% of your income to insure medical and dental care?

The ballots registered 49% willing, 51% unwilling. Among those connected with the medical profession sentiment for the bill was stronger (about two-fifths willing and three-fifths unwilling) despite the opposition of the American Medical Association. Those connected with the dental profession voted unanimously against the proposal.—

If, without any particular knowledge on this question brought to them by the medical profession, the score is 51-49, there should be a material increase in the number of opponents, when the AMA campaign gets into full swing. The salvage of free medicine in this country, the last large nation on earth that contains a large middle class, rests upon educating this middle class, where the mass of votes resides. We consider the AMA decision to assess their members as step one, and as step two the engagement of Whitaker and Baxter, formerly of San Francisco, but now of Chicago, as directors of this national educational campaign, as the smartest thing the AMA has done in years, despite the fact that Ewing et al. brand this educational fund as a "slush fund," etc. They evidently fear its effect upon the public or they would not be squirming so vigorously so early in the game. Socialized medicine *may* come in America, but if and when it does, the bureaucrats will know that they have been in a battle. It is possible, even probable, that the final score will be on the side of a free medical profession and a free people; it certainly will come out that way if enough people are given enough facts.

National Odd Shoe Exchange

A Non-Profit "Mismated" Shoe Service For Men, Women and Children Suffering From Polio, Injury, Amputation, or Disease

The National Odd Shoe Exchange is a non-profit service rendered to persons whose feet are not mates or for persons with only one foot. Its function is to service as a clearing house; to bring together those persons with mutual problems and to aid them in securing serviceable shoes from those in similar situations who have them to spare.

The Exchange does not deal with shoes, but with names of persons of similar ages and tastes in shoe styles who have available, or are seeking, "mismates."

The National Odd Shoe Exchange was begun by its director, Miss Ruth C. Rubin, as an answer to her own problem. Due to an attack of polio, Miss Rubin was required to wear different shoe sizes and thus became acutely aware of the problem confronting thousands of other persons in similar situations.

The difficulties confronting individuals with mismatched feet are both trying and expensive. In the past, in order to get two properly fitting shoes, it was necessary to buy two pairs—one in each of the required sizes. In order to get one shoe, it was necessary to buy an unneeded shoe also. This raised the question not only of double expense, but how to make the best use of left-over odd sized shoes. These left-over shoes were too good to throw away, but of no value to anyone except a person wearing that particular size. The National Odd Shoe Exchange was formed for the purpose of solving this problem and being mutually helpful to persons in the same difficulty.

Originally the project was begun as a free service, but it has grown beyond the expectations of its founder. In order that this essential service be continued and the largest number of people be served, a nominal registration fee is now necessary. This fee has been established as the very minimum necessary to handle the expense of operation.

The National Odd Shoe Exchange cannot guarantee that everyone will be immediately successful in finding "mismates." However, the past year's experience has proved that

hundreds of persons have found their "mismates." As the registration grows (and it is increasing daily), the service will be more and more helpful. Many have already saved considerable sums of money through the Exchange.

The annual registration fee is \$3.00. This includes the indexing and cross-indexing of all information necessary to bring "mismates" together. This is a complicated process, but one which has been effectively worked out by experience.

Further information or more details may be obtained from Miss Ruth C. Rubin, Director, National Odd Shoe Exchange, 6267 Clemens Avenue, St. Louis 5, Missouri.

BOOK REVIEWS

A-B-C's of Sulfonamide and Antibiotic Therapy: By Perrin H. Long, M.D., Professor of Preventive Medicine, Johns Hopkins University. Pp. 231. Cloth. Price, \$3.50. Philadelphia: W. B. Saunders Company, 1948.

This manual deals only with antibiotics of proved value. The clinical pharmacology, toxicity, and methods of administration are discussed, every necessary phase being covered. The topical use of these drugs is omitted as being unnecessary and, at times, harmful. Representing the twelve year experience of a pioneer in this field, the book can be fully recommended.

Medical Writing: The Technic and Art. By Morris Fishbein, M.D., Editor, *The Journal of the American Medical Association*. With the assistance of Jewel F. Whelan, Assistant to the Editor. 2nd Edition. Pp. 292, with 36 illustrations. Cloth. Price, \$4.00. Philadelphia: The Blakiston Company, 1948.

The material in this book has been developed as a result of handling thousands of manuscripts for the *Journal of the American Medical Association* and the various special periodicals published by the Association.

Valuable and important suggestions have been well integrated in this new edition and helpful new suggestions are presented in the chapter on Indexing by Miss Laura E. Moore and in the chapter on Illustrations by Mr. William Brown McNett.

The book will be of service to physicians and writers in all scientific fields preparing articles ranging from the briefest report to a full treatise. It offers help in formulating style,

abbreviation, spelling and capitalization rules, proofreading, indexing, as well as the essential knowledge needed to assure proper treatment of a scientific or medical subject, and gives expert guidance in the display of individuality and literary talent.

Correlative Neuroanatomy. By Joseph J. McDonald, M. D., Joseph G. Chusid, M.D., and Jack Lange, M.D. 4th Edition. Pp. 156, with 60 illustrations. Paper. Price, \$3.00. University Medical Publishers, Palo Alto, California, 1948.

A comprehensive manual for the student in gross anatomy, neuroanatomy, neurodiagnosis, and neurology which correlates the anatomical and physiological background with the clinical findings of neurological disorders. Included are numerous diagrams which clearly show the distribution and functional components of the cranial, spinal, and autonomic nerves, and the essentials of brain and spinal cord localization.

The first part deals with the peripheral nerves, and each major nerve is well illustrated and systematically described. The autonomies are concisely discussed, including the physiology and pharmacology of the system.

The second section is on neurodiagnosis and includes a discussion of the anatomy, physiology and localization in the brain and spinal cord. The subjects of motion, sensation, reflexes, trophic changes, electrical examination, intracranial pneumography and examination of the cerebrospinal fluid are thoroughly outlined. A discussion of electroencephalography with representative electroencephalograms has been added.

The third section of the book deals with diseases and disorders of the central nervous system, and has been completely rewritten and enlarged.

The appendix gives a complete list of neurological signs and syndromes, a brief discussion of muscular dystrophies and atrophies, and an outline of the neurological examination.

The Healthy Hunzas. By J. I. Rodale. Pp. 257, with 16 illustrations. Cloth. Price, \$2.75. Emmaus, Pa.: 1948.

This is an interesting story about a people (22,000 of them), who live in northern India, not far from Tibet, whose longevity is most remarkable. This, they believe, is due to their "organic farming," by which everything taken from the soil is returned to it. Dealing

as much with soil conservation as with health, physical and mental, these Indians may have something we Americans should copy.

Iowa Cancer Manual. By The Cancer Committee of the Iowa State Medical Society. Pp. 160. Paper. Price, \$1.00. Cedar Rapids: Iowa State Medical Society, 1948.

This Cancer Manual is one of the better ones and the committee is to be congratulated in producing such an authoritative and up-to-the-minute set of standards for the diagnosis and treatment of cancer. A buck well spent!

Control of Pain with Saddle Block and Higher Spinal Anesthesia. Edited by J. H. Walton, M.D. Pp. 52, with 12 plates in color. Summit, N. J.: Ciba Pharmaceutical Products, Inc., 1948.

Late in 1945, Adriani and his co-workers described what is now known as the saddle block method of obstetric analgesia. They used a simple one-injection technique, completely blocking sensation from the uterus and birth canal for as long as three hours. With this method, they found patients to be comfortable, conscious and cooperative during labor and delivery.

In the past two years, saddle block has spread throughout the country. Many thousand deliveries have been conducted with this technique, with some variation, has also been found useful for major operative procedures. The information in this book will be of value to a great many physicians.

With the appearance of Volume II, 1948, The Hebrew Medical Journal, 983 Park Avenue, New York City, edited by Moses Einhorn, M.D., concludes its 21st successful year of publication.

In publishing the *Journal*, the editors aim to meet the need for a medical journal written in Hebrew, with English summaries, thus aiding greatly in the advancement and development of Hebrew medical literature.

This issue contains an article on Hypertensive Vascular Disease by Benjamin Jablons, M. D. There is also a discussion on clinical observations and treatment of 190 cases of Malaria in Palestine, by Dr. P. Ephrati of Tiberias.

In addition, under the heading of "Personalia," biographical sketches of Professor Heinrich Finkelstein, pediatrician; Professor Max Neuberger, medical historian; and Dr. Solomon Solis-Cohen of Philadelphia, are presented.

1789—MEDICAL SOCIETY OF DELAWARE—1949

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G. A. Beatty, Wilmington
J. R. Caldwell, Dover
J. M. Messick, Wilmington
PUBLIC POLICY AND LEGISLATION
J. S. McDaniel, Dover
J. D. Niles, Middletown
R. J. Comegys, Clayton

PUBLICATION
W. E. Bird, Wilmington
M. A. Tarumianz, Farnhurst
G. A. Beatty, Wilmington
MEDICAL EDUCATION
J. W. Howard, Wilmington
L. B. Flynn, Wilmington
J. W. Lynch, Seaford

NEUROLOGY
C. J. Prickett, Smyrna
G. W. K. Forrest, Wilmington
U. W. Hocker, Lewes

SPECIAL COMMITTEES
ADVISORY WOMAN'S AUXILIARY
Roger Murray, Wilmington
E. S. Parvis, Wilmington
P. R. Smith, Wilmington
I. J. MacCollum, Wyoming
J. R. Elliott, Laurel

CANCER
W. W. Lattonius, Wilmington
D. M. Gay, Wilmington
J. W. Hooker, Wilmington
J. F. Hynes, Wilmington
E. G. Laird, Wilmington
C. J. Prickett, Smyrna
J. W. Spies, Dover
James Beebe, Lewes
Bruce Barnes, Seaford

SOCIAL HYGIENE
A. D. King, Wilmington
R. J. Comegys, Clayton
G. W. Van Valkenburg, Georgetown

MATERNAL AND INFANT MORTALITY
A. H. Williams, Laurel
A. M. Gehret, Wilmington
C. L. Hudiburg, Wilmington
S. W. Rennie, Wilmington
R. O. Y. Warren, Wilmington
J. S. McDaniel, Jr., Dover

MENTAL HEALTH
G. W. K. Forrest, Wilmington
C. B. Scull, Dover
O. V. James, Milford

MRS. W. C. PRITCHARD, President-Elect, Smyrna
Mrs. C. L. Munson, Recording Secretary, Wilmington

NEW CASTLE COUNTY MEDICAL SOCIETY

Meets Third Tuesday

C. L. Munson, President
R. O. Y. Warren, President-elect
A. D. King, Vice-President
D. D. Burch, Secretary
CHARLES LEVY, Treasurer

Delegates (1949): L. W. Anderson, W. E. Bird, L. B. Flinn, G. W. K. Forrest, J. F. Hynes, L. J. Jones, E. G. Laird, L. C. McGee, Roger Murray, J. D. Niles, V. D. Washburn.

Alternates (1949): E. M. Bohan, I. M. Flinn, Jr., A. D. King, C. E. Maroney, E. T. O'Donnell, W. M. Pearson, D. J. Preston, W. T. Readon, J. A. Shapiro, O. N. Stern, J. W. Uri.

Delegates (1950): C. W. Bancroft, N. L. Cannon, I. L. Chapman, A. M. Gehret, A. L. Heck, J. W. Hooker, C. T. Lawrence, Charles Levy, C. L. Munson, M. B. Pennington, J. C. Pierson, S. H. Stradley.

Alternates (1950): J. W. Barnhart, W. W. Briggs, J. J. Bulger, C. R. Donoho, S. G. Elbert, Jr., F. A. Jones, W. O. LaMotte, Jr., W. H. Lee, J. W. Maroney, F. P. Rovitti, Alex. Smith, H. P. Sortman.

MEDICAL COUNCIL OF DELAWARE

Hon. Charles S. Richards, President; Joseph S. McDaniel, M. D., Secretary; Wallace M. Johnson.

BOARD OF MEDICAL EXAMINERS

J. S. McDaniel, President-Secretary; Wm. Marshall, Assistant Secretary; W. E. Bird, J. E. Marvil, L. J. Jones.

COUNCILORS

SECRETARY, G. A. Beatty, Wilmington
TREASURER, W. W. Lattomus, Wilmington

Clarence J. Prickett, Smyrna (1951)
ALTERNATE: C. E. Wagner, Wilmington
REPRESENTATIVE TO DELAWARE ACADEMY OF MEDICINE, W. O. LaMotte, Wilmington

SPECIAL COMMITTEES

TUBERCULOSIS

L. D. Phillips, Marshallton
G. A. Beatty, Wilmington
L. B. Flinn, Wilmington
L. C. McGee, Wilmington
J. M. Messick, Wilmington
C. J. Prickett, Smyrna
Stanley Worden, Dover
William Marshall, Jr., Milford
C. M. Moyer, Laurel

MEDICAL ECONOMICS

Stanley Worden, Dover
W. E. Bird, Wilmington
J. W. Lynch, Seaford

PUBLIC RELATIONS

E. R. Mayerberg, Wilmington
B. M. Allen, Wilmington
I. L. Chipman, Wilmington
W. O. LaMotte, Wilmington
C. L. Munson, Wilmington
J. S. McDaniel, Dover
W. T. Chipman, Harrington
J. L. Fox, Seaford
H. M. Manning, Seaford

REVISION OF BY-LAWS

W. E. Bird, Wilmington
D. D. Burch, Wilmington
C. E. Wagner, Wilmington
J. S. McDaniel, Dover
R. C. Beebe, Lewes

VOCATIONAL REHABILITATION

James Beebe, Lewes
G. A. Beatty, Wilmington
I. M. Flinn, Wilmington
D. J. Preston, Wilmington
E. L. Stambaugh, Lewes

MEDICAL SERVICE

L. C. McGee, Wilmington
D. D. Burch, Wilmington
W. M. Johnson, Newark
I. J. MacCollum, Wyoming
James Beebe, Lewes

BUDGET

C. E. Wagner, Wilmington
J. M. Messick, Wilmington
J. D. Niles, Middletown
J. S. McDaniel, Dover
E. L. Stambaugh, Lewes

WOMAN'S AUXILIARY

MRS. ROGER MURRAY, President, Wilmington

MRS. J. J. CASSIDY, Corresponding Secretary, Wilmington

MRS. C. M. BANCROFT, Treasurer, Wilmington

SPECIAL COMMITTEES

RURAL MEDICAL SERVICE

J. R. Downes, Newark
C. R. Donoho, Newark
J. D. Niles, Middletown
C. J. Prickett, Smyrna
H. W. Smith, Harrington
Bruce Barnes, Seaford
H. S. Riggan, Seaford

INDUSTRIAL HEALTH

G. H. Gehrmann, Wilmington
L. C. McGee, Wilmington
H. L. Springer, Wilmington
E. H. Mercer, Dover
H. V'P Wilson, Dover
D. L. Bice, Seaford
A. C. Smoot, Georgetown

HEART DISEASE

E. R. Miller, Wilmington
A. H. Clagett, Jr., Wilmington
E. M. Krieger, Wilmington
F. R. Everett, Dover
R. L. Klingel, Lewes

DIABETES

L. B. Flinn, Wilmington
J. R. Durham, Jr., Wilmington
Charles Levy, Wilmington
Stanley Worden, Dover
L. L. Fitchett, Milford

ARTHRITIS

A. R. Shands, Wilmington
I. M. Flinn, Wilmington
A. J. Heather, Wilmington
C. C. Fooks, Milford
O. A. James, Milford

TILTON PARK

G. W. K. Forrest, Wilmington
Ira Burns, Wilmington
W. O. LaMotte, Wilmington
F. F. Pierson, Wilmington
M. I. Samuel, Wilmington

HOSPITALS AND PRACTICE OF MEDICINE

C. E. Wagner, Wilmington
G. A. Beatty, Wilmington
L. B. Flinn, Wilmington
J. W. Howard, Wilmington
W. O. LaMotte, Wilmington
J. S. McDaniel, Dover
J. B. Waples, Georgetown

KENT COUNTY MEDICAL SOCIETY

Meets First Wednesday

STANLEY WORDEN, President, Dover.
R. R. LAYTON, Vice-President, Dover.
C. J. PRICKETT, Secretary-Treasurer, Smyrna.

Delegates: Henry V'P Wilson, Dover,
I. J. MacCollum, Wyoming.

Alternates: J. S. McDaniel, Dover,
Hewitt W. Smith, Harrington.

Censor: R. W. Comegys, Clayton.

DELAWARE ACADEMY OF MEDICINE

Open 10 A.M. to 5 P.M.

GERALD A. BEATTY, President.

B. M. ALLEN, First Vice-President.

ROBERT R. WIER, Second Vice-President.

ANDREW M. GEHRET, Secretary.

IRVINE M. FLINN, JR., Treasurer.

DELAWARE PHARMACEUTICAL SOCIETY

VERNON LARSON, President, Wilmington.

IRVIN WALLER, First Vice-President, Bridgeville.

HARVEY C. HELM, Second Vice-President, Dover.

WALTER SCHUELER, Third Vice-President, Wilmington.

J. WALLACE WATSON, Secretary, Wilmington.

ALBERT DOUGHERTY, Treasurer, Wilmington.

SUSSEX COUNTY MEDICAL SOCIETY

Meets Second Thursday

JOHN W. LYNCH, President, Seaford.
JAMES E. MARVIL, Vice-President, Laurel.

LESLIE M. DOBSON, Secretary-Treasurer, Milford.

Delegates: Bruce Barnes, Seaford;
T. J. Tobin, Milton; W. G. Hume, Selbyville; O. A. James, Milford.

Alternates: Wilbur Ellis, Laurel;

R. L. Klingel, Rehoboth; A. C. Smoot, Georgetown; L. L. Fitchett, Milford.

DELAWARE STATE DENTAL SOCIETY

R. R. WIER, President, Wilmington.
CLYDE COX, First Vice-President, Newark.

JOSEPH MACK, Second Vice-President, Seaford.

NORBERT GLADNICK, Secretary, Wilmington.

H. H. McALLISTER, Treasurer, Wilmington.

P. E. MUSSelman, Delegate A.D.A., Newark.

CLYDE NELSON, Alternate A.D.A., Milford.

DELAWARE STATE BOARD OF HEALTH

J. D. Niles, M. D., President, Middletown; Mrs. F. G. Tallman, Vice-President, Wilmington; W. B. Atkins, D. D. S., Secretary, Millsboro; Bruce Barnes, M. D., Seaford; Mrs. C. M. Dillon, Wilmington; J. B. Baker, M. D., Milford; Mrs. Alden Keane, Middleton; E. R. Mayerberg, M. D., Wilmington; Edwin Cameron, M. D., Executive Secretary, Dover.

